Chapter Four

The Environment: What's There Now, Project Effects, and Mitigation

The Proposed Project was evaluated for its potential to impact noise, geology and soils, transportation, water resources, wetlands, and wildlife and vegetation.

If the Proposed Project is built, noise levels from traffic are projected to slightly increase in a few locations. Noise barriers, planned to mitigate the likely increases, will reduce the number of residences that will approach or exceed the noise abatement criteria from 299 to 137. Negligible permanent impacts will result to local soils, geology, and topography. Design features will maintain and enhance slope stability and minimize erosion potential.

Transportation will be improved by the Proposed Project, with reduced drive times from the airport to I-405 in the morning and evening peak periods, dramatically reduced congestion during most hours on the North Airport Expressway on-ramp, provision of more mainline capacity allowing motorists more room to maneuver to their downstream destinations, reduced merge conflicts, and reduced backups from I-405.

Stormwater mitigation measures will be implemented to minimize and/or eliminate potential permanent impacts to surface (Gilliam Creek) and groundwater resources.

Permanent wetland impacts could result from degradation of water quality, changes in hydrologic connections, loss of wetland acreage, and loss of groundwater recharge area. However, compensatory

mitigation in the form of wetland creation, restoration, or enhancement will be provided for permanent impacts to wetlands at a mitigation site, most likely within the same Water Resource Inventory Area.

The Proposed Project will permanently displace wildlife in areas proposed for clearing. In addition, vegetation removal will affect wildlife by reducing food resources and shelter sites, and increasing exposure of aquatic resources to weather and potential pollution. In addition, shading from expanded bridges or increased retaining wall heights will reduce plant vigor.

A project's implementation often depends on whether it will impact surrounding communities or the natural environment.

This chapter summarizes the analysis of general environmental and community features within the SR 518 Northern Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Project study area. Information contained in this Environmental Assessment was taken from the environmental discipline reports prepared specifically for this project. The discipline reports are on a CD included with this Environmental Assessment. In addition, they are available from WSDOT's Urban Corridors Office and on WSDOT's website at www.wsdot.wa.gov/Projects/SR518 .

Discipline reports focus on an environmental topic (discipline) such as wildlife, noise, water quality, and other community or natural resources. They present an analysis of the environment with respect to that discipline, how the project will likely affect that environment, and offer recommendations on how best to avoid or minimize adverse effects to that environmental or community feature.

1 How does an environmental assessment analyze community and environmental features?

A number of environmental and community features are reviewed as part of the environmental process. Typically, information regarding the existing conditions of each environmental discipline or topic within the study area is collected from a number of sources such as agency plans, maps, and aerial photography. Information about future conditions of the area is also collected. Following the gathering of these data, an impacts analysis is performed. In general, an impacts analysis involves overlaying the Proposed Project upon the existing (and future) conditions findings. Based on this "overlay," likely potential adverse impacts to the physical and sociological elements of the study area are identified. The extent of these impacts is typically quantified, if appropriate. Mitigation measures – that is, ways in which adverse impacts can be avoided or made less harmful – are also identified as part of this analysis.

2 What environmental and community disciplines were analyzed for this Proposed Project?

Based on WSDOT's *Environmental Procedures Manual M31-11*, a number of disciplines are reviewed as part of an environmental analysis. **Exhibit 4-1** lists the discipline reports that were produced for this project and environmental elements covered in the reports.

3 Are all of these disciplines discussed in this document?

Although discipline reports were prepared for all of the subjects listed in **Exhibit 4-1**, most disciplines are not discussed in this document. Through analysis, the project team found that for most of these disciplines, there will not be any permanent impacts. Only a few community and environmental disciplines will be affected by the Proposed

Exhibit 4-1
Environmental and Community Disciplines

DISCIPLINES REVIEWED FOR THE PROPOSED PROJECT
GEOLOGY AND SOILS
AIR QUALITY
WATER RESOURCES -- Surface Water and Floodplains -- Water Quality -- Groundwater
ECOSYSTEMS -- Vegetation -- Wildlife -- Wetlands -- Fish
ENERGY
NOISE
HAZARDOUS MATERIALS
LAND USE (INCLUDING SHORELINES, FARMLANDS, PARKS AND RECREATION)
SOCIAL AND ECONOMIC (INCLUDING ENVIRONMENTAL JUSTICE)
TRANSPORTATION
CULTURAL RESOURCES (HISTORIC AND ARCHAEOLOGICAL)
VISUAL QUALITY

Project. For this analysis, the Environmental Assessment incorporates by reference the 12 discipline reports prepared for this document.

Which areas of the environment will be affected?

The project team determined that impacts will occur to the following areas of the environment:

- Noise;
- Geology and Soils;
- Transportation;
- Water Resources;
- Wetlands; and
- Wildlife and Vegetation.

This Environmental Assessment summarizes findings within the project area, as well as potential impacts and mitigation measures. More information is contained in the 12 discipline reports prepared for this document. These reports contain details of the findings, as well as specific methods used for this evaluation. The discipline reports are located on the CD contained in this document.

Was air quality considered?

Yes. The Proposed Project lies within ozone and CO maintenance areas. Air quality emissions in the Puget Sound region are currently being managed under the provisions of Air Quality Maintenance Plans for ozone and CO.

Under the Clean Air Act, in air quality maintenance areas, regionally significant projects are evaluated for their conformity to Air Quality Maintenance Plans. Projects may only be constructed once it is demonstrated that they conform to the plans. The Proposed Project conforms to the Puget Sound Air Quality Maintenance Plans.

4 Noise

An understanding of the existing noise environment is necessary to predict the impacts of noise-generating elements of the Proposed Project. These elements influence the need for project construction or design features that mitigate potential adverse effects.

If the Proposed Project is built, noise levels from traffic are projected to slightly increase in a few locations. Without mitigation, 299 residences will approach or exceed the noise abatement criteria. The noise abatement criteria are measurements used by the federal government to determine if noise mitigation is appropriate.

Noise barriers are planned to mitigate the likely increases in noise. With the Proposed Project and its proposed noise barriers, the number of residences that will approach or

Want to know more about Noise?

The full SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Noise Discipline Report is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

exceed the noise abatement criteria will be reduced from 299 to 137.

How were noise levels evaluated for the Proposed Project?

WSDOT uses the Federal Highway Administration (FHWA) *Traffic Noise Model* to estimate traffic noise levels. To evaluate levels in the study area, WSDOT measured current noise levels and current traffic volumes. The project team used the *Traffic Noise Model* to compare these data and to make noise projections for the future.

The total future noise level that will be experienced in the study area was calculated by adding the traffic noise level to the background aircraft noise level and the predicted future light rail noise level. Background aircraft noise was estimated by comparing measured daytime noise levels at two Port of Seattle noise monitoring sites. Future light rail noise levels were provided by Sound Transit and used to estimate the contribution of light rail noise.

How loud are the noises we hear every day?

Soft whisper from 15 feet: 30 dBA

Television from 10 feet: 60 dBA

Freeway traffic from 50 feet: 70 dBA

City bus from 50 feet: 80 dBA

Jet airliner from 200 feet: 120 dBA

How noisy is the project area?

Traffic noise is the dominant noise source in the project study area, with steady aircraft noise from nearby Sea-Tac International Airport. Existing traffic noise levels range between 55 and 73 decibels (dBA). A decibel is a measurement used to explain the level of a sound – the lower the number, the lower the sound.

Will the project affect noise levels in the study area?

For the Proposed Project, modeling indicates that without mitigation, noise levels will approach or exceed the noise abatement criteria at 33 locations (299 residences). Traffic noise levels at thirty of these 33 locations currently approach or exceed the FHWA criteria. With the noise abatement measures proposed as part of this project, noise levels at 137 residences will continue to approach or exceed the criteria. For this Proposed Project, noise barriers are proposed for noise abatement.

How did WSDOT determine if a barrier is needed?

WSDOT evaluates many factors to determine whether barriers are feasible and/or reasonable. To be feasible, a barrier must be constructible in a location that achieves a noise reduction of at least 7 dBA at one or more receptors (locations of frequent outdoor use, where noise levels are predicted), and a reduction of at least 5 dBA at most of the first row of receptors. Reasonableness depends on the number of sensitive receptors (for example, homes, hospitals, schools) that will benefit from a reduction in noise of at least 3 dBA. It also depends on the cost-effectiveness of the barriers, aesthetics, safety, and the desires of nearby residents.

What noise barriers are proposed for this project?

Three noise barriers (walls) are proposed for the project corridor.[1] These three barriers are feasible considering the total noise environment, which includes traffic noise, aircraft noise, and future light rail noise. **Exhibits 4-2** and **4-3** on the following pages identify the general location and characteristics of these walls.

Will project construction temporarily affect noise levels?

Yes, noise will be generated during construction. Roadway construction is usually carried out in several steps, each with its own mix of equipment and noise characteristics.

Construction activities will involve clearing, cut-and-fill (grading), removing old roadways, importing fill, and paving.

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[1] Originally four noise barriers were considered for this project. Based on further investigation and analysis, it was determined that noise barrier #3 did not meet the reasonableness test. It was therefore decided that only noise barriers 1, 2, and 4 would be further investigated.

Exhibit 4-2

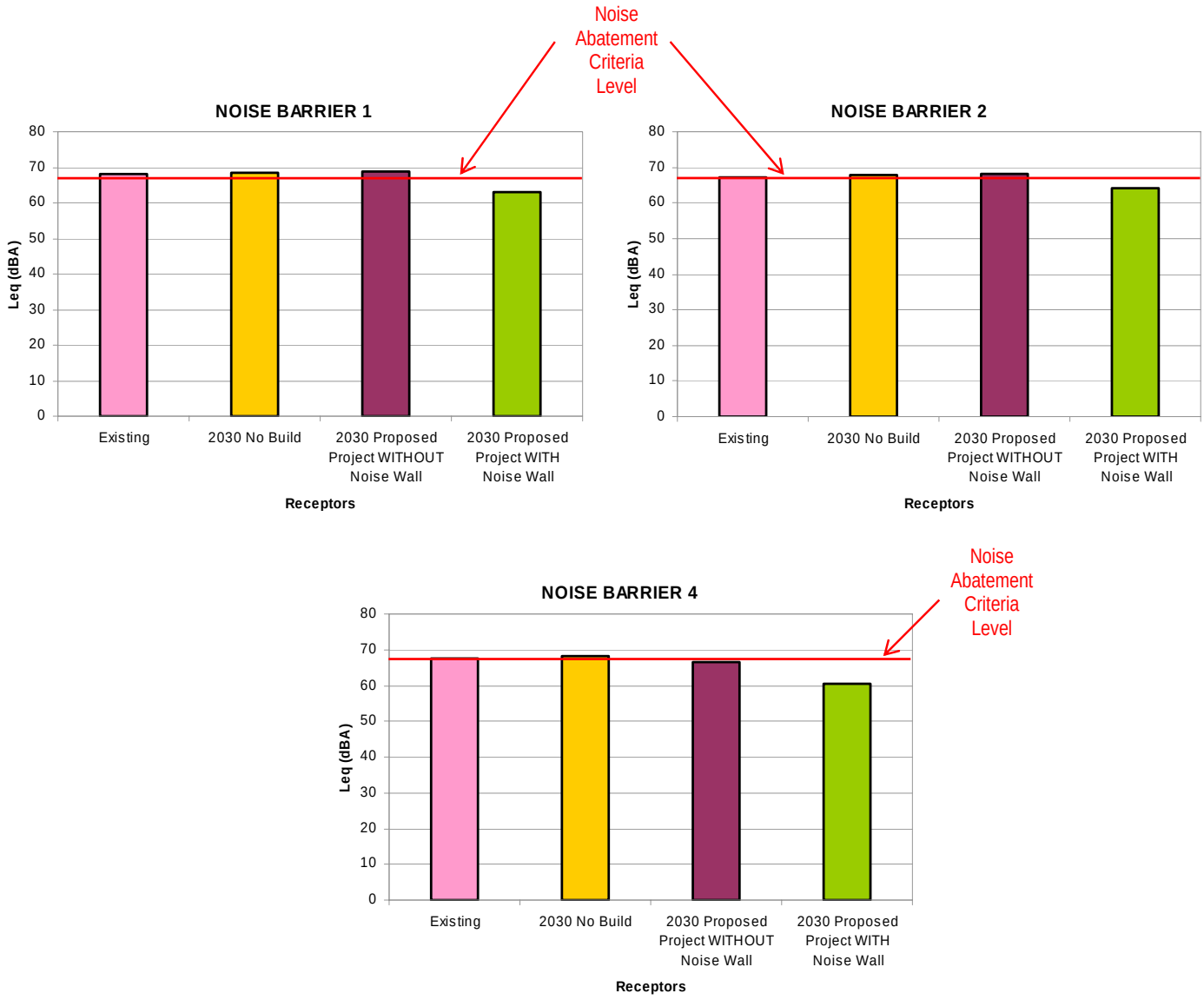
Location and Characteristics of Noise Barriers

Noise Barrier	Location	Size (height and length)	Benefit
1	Located along SR 518's northern right-of-way, north of the westbound SR 518 off-ramp to the North Airport Expressway, south of South 154th Street	Segment 1: 610 feet long and 24 feet tall. Segment 2: 120 feet long and 24 feet tall.	Noise Barrier 1 would reduce noise levels below the NAC at 42 residential units.
2	Located along the northern edge of pavement of westbound SR 518, with its eastern end located approximately 100 feet west of the 42nd Avenue South bridge and its western end located approximately 600 feet east of SR 99.	1,590 feet long and from 18 to 24 feet tall	Noise barrier 2 would reduce noise levels below the NAC at 110 residences.
4	Located atop the planned retaining wall which will be along the outside edge of pavement of the new eastbound on-ramp to SR 518 from the North Airport Expressway, Noise Barrier 4 would begin approximately 750 feet east of SR 99 and continue eastward until approximately 100 feet west of the SR 518 bridge over 42nd Avenue South.	1,860 feet long and 14 feet tall	Noise Barrier 4 would reduce noise levels below the NAC at 66 residences.

Exhibit 4-3

Comparison of Noise Levels at Each Noise Barrier Location

Note: Values show an average of the receptors measured.



How will effects from construction noise be minimized?

To reduce construction noise at nearby receptors, the following measures will be incorporated into construction plans and specifications:

- Limiting the noisiest construction activities, such as pile driving (if allowed by resource agencies), to between the hours of 7 am and 10 pm to reduce construction noise levels during sensitive nighttime hours;
- Outfitting construction equipment engines with adequate mufflers, intake silencers, and engine enclosures to reduce their noise by 5 to 10 dBA;
- Turning off construction equipment during prolonged periods of nonuse to eliminate noise;
- Requiring contractors to maintain all equipment and train their equipment operators in good practices to reduce noise levels;
- Locating stationary equipment away from receiving properties to decrease noise;
- Constructing temporary noise barriers or curtains around stationary equipment that must be located close to residences to decrease noise levels at nearby sensitive receptors;
- Requiring resilient bed liners in dump trucks to be loaded onsite during nighttime hours; and
- Requiring contractors to use ambient sound-sensing backup alarms that could reduce disturbances from backup alarms during quieter construction periods.
- Performance of construction activities during night-time hours would require noise variances from the city of Tukwila and the city of SeaTac.

5 Geology and Soils

An understanding of the geology and soils that form the local environmental landscape is necessary to properly assess the physical and topographic features of the Proposed Project study area. These features influence the project design elements (i.e., foundations and walls) and help to identify needed excavation techniques and effects.

The Proposed Project will result in negligible permanent impacts to local soils, geology, and topography along the corridor. The project will result in the use of some local sand and gravel resources as fill materials.

WSDOT will employ design features to maintain and enhance slope stability (i.e., constructing retaining walls, and importing some fill material), and use best management practices (BMPs) to minimize erosion potential.

Want to know more about Geology and Soils?

The full SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Geology and Soils Discipline Report is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

What is a BMP?

Physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollutant discharges.

How were geology and soils evaluated for the Proposed Project?

Scientists and planners studied the geology, soils, topography, physical features, and potential for erosion in the study area. They also considered how subsurface water conditions would affect soil moisture, water supply, wetlands, and water movement. Their data sources included geological maps, aerial photos, field surveys, and geotechnical reports.

What geology and soils are found in the study area?

The project area is located on the Des Moines Drift Plain, which is a broad glacial plain (made up of alluvial soils) that has been dissected by stream drainages and tributaries of the Green River. The majority of the project area is underlain by dense glacial soils. The roadway alignment crosses several areas underlain by soils deposited after the glaciers receded. In localized areas, these soils include artificial fill, materials deposited by flowing water, lake and peat deposits, and recessional outwash. Recessional outwash is the sands and silts left by recessing glacial

waters. In addition, the groundwater table is relatively shallow.

What are the geologic hazards within the project study area?

Geologic hazards consist of landslide, steep slope, and erosion and seismic hazard areas (see **Exhibit 4-4**). Each of these hazard types is located in the project study area.

LANDSLIDE/STEEP SLOPE HAZARD

A large, ancient landslide has been identified south and uphill of the existing alignment east of 42nd Avenue South. Portions of this slide were reactivated during construction of the existing SR 518 in the late 1960s.

EROSION HAZARD

Areas of moderate erosion potential are located along the south side of the SR 99 to SR 518 on-ramp. In addition, areas of severe erosion potential exist along the southern edge of the project study area east of 42nd Avenue South to the end of the SR 518/I-5/I-405 interchange.

These known geologic hazard areas are shown in **Exhibit 4-5** on the following page.

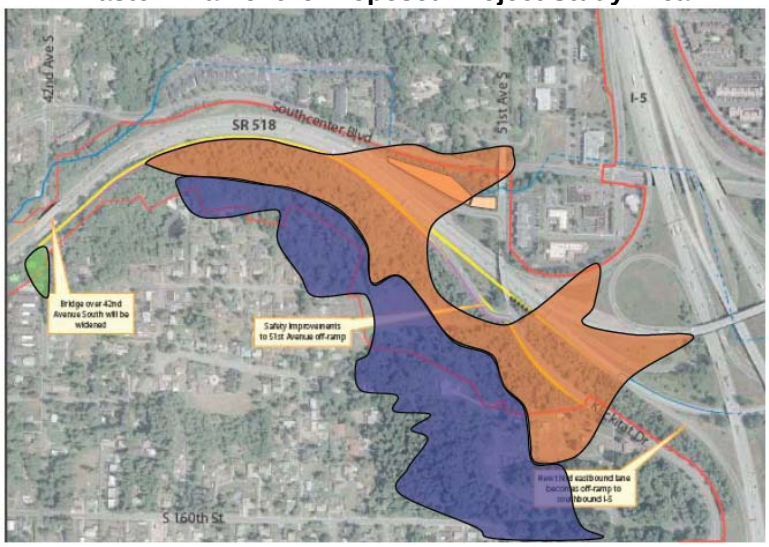
Exhibit 4-4
Types of Geologic Hazards

Type of Hazard	Description
Landslide	Often associated with unconsolidated or weathered glacial deposits and alluvial fans that may also contain impermeable soils, springs or groundwater seepage. Alluvial fans are fan-shaped deposits of water-transported materials.
Steep Slope	Landslide hazard areas or slopes inclined at 40 percent or greater.
Erosion	Areas with soils that form on silts or clays and are steeper than 15 percent, or areas with soils that form on sands or gravels that are sloped at 40 percent or more.
Seismic Hazard Area	Areas subject to severe risk of earthquake damage as a result of seismically induced ground shaking, slope failure, settlement, lateral spreading, surface faulting, or soil liquefaction.

Exhibit 4-5
Geologic Hazards in the Project Study Area

Western Half of the Proposed Project Study Area

Eastern Half of the Proposed Project Study Area



Legend

- Existing Right-of-Way
- Proposed Edge of Pavement
- Proposed Retaining Wall
- Streams

Geologic Hazard Areas

- Erosion Hazard Area
- Landslide Hazard Area
- Seismic Hazard Area

SEISMIC ACTIVITY

The proposed project area lies within a region of moderate to high seismic risk that contains several potentially active faults. This means that the region is, on average, more likely to be periodically subject to earthquakes that generate significant ground shaking than other areas within the United States.

Areas adjacent to or within the proposed project alignment where potentially liquefiable soils have been identified include the depression south of the SR 99 to SR 518 on-ramp and at the 42nd Avenue South undercrossing.

What is liquefaction?

Soil liquefaction is the loss of strength that can occur in loose, saturated soil during or following an earthquake. Liquefaction occurs most readily in sand deposits. In liquefied zones, the strength of the soil decreases and the ability of the soil to support foundations for buildings and bridges is reduced.

How will geologic resources be affected by the Proposed Project?

Construction of the Proposed Project will result in subtle topographic changes along the alignment, enhanced stability of adjacent cut slopes, and consumption of local sand and gravel resources.

The Proposed Project will require significant amounts of fill between SR 99 and 42nd Avenue South and substantial cuts between 42nd Avenue South and the I-5 interchange to accommodate an additional traffic lane. Portions of the alignment will cross erosion and potential landslide hazard areas east of 42nd Avenue South. Shallow groundwater will likely be encountered in some areas south of the SR 99 to SR 518 on-ramp and within the vicinity of 42nd Avenue South.

The existence of wetlands and marginally stable or previously unstable slopes will require retaining walls in some areas to reduce the proposed project footprint and stabilize the slopes (see Exhibit 4-5). Low-strength surface soils and relatively high groundwater levels expected along the south side of the SR 518 bridge over 42nd Avenue South will require the use of deep foundations for bridge support.

How is the project design affected by geology and soil types in the area?

Design and construction of the Proposed Project will be based on existing geologic and soil conditions in the area and will follow well established WSDOT design criteria for

managing the types of conditions found in the project area. Design elements will be incorporated into the project specifications to address the identified conditions. The project description (see Chapter Three) includes several design and construction elements that have been incorporated into the project to address conditions such as slope stability and landslide areas, soft ground areas, and protection of groundwater resources.

One important design feature to stabilize soil slopes is the construction of retaining walls and drainage facilities. Exhibit 3-3 in Chapter Three illustrates the general location of these walls.

What measures are proposed to avoid or minimize effects to geology and soils during construction?

WSDOT will implement required measures to avoid or minimize geologic impacts during construction. These will include the following:

- A large landslide feature was identified at the eastern end of the project. The geotechnical investigation has evaluated the portions of the landslide area adjacent to the project, and the design will include appropriate construction procedures to maintain or enhance slope stability.
- WSDOT will prepare contract plans that include earthwork plans, drainage plans, and slope stabilization plans, including horizontal drains and temporary and permanent erosion control plans.
- During construction, WSDOT will drain areas of observed or suspected groundwater seepage to reduce the risk of landslide and surface sloughing through the use of gravel drainage blankets, French drains, horizontal drains, and/or placement of a surface rock facing or similar methods.
- WSDOT will develop the means and methods to avoid or minimize settlement. Construction vibration, particularly that generated by driven pile installation (if allowed by resource agencies), large diameter drilled

pier installation, and any required ground improvement, can cause settlement of adjacent areas underlain by loose granular soils. Project engineers will identify and mitigate these areas during the design phase.

- WSDOT will prepare a Temporary Erosion and Sedimentation Control Plan.
- Should any best management practices (BMP) or other operation not function as intended, the contractor will take additional action to minimize erosion, maintain water quality, and achieve the intended environmental performance.

6 Transportation

Understanding existing and future traffic conditions is necessary to properly assess the effects of the project on the transportation system. The Proposed Project will alleviate an identified traffic congestion problem, both existing and in the future. The evaluation of traffic conditions, therefore, is intended to compare what future traffic conditions will be with and without the proposed improvements.

If the Proposed Project is built, drive times from the airport to I-405 in the morning and evening peak periods will be shortened, congestion will be dramatically reduced during most hours on the North Airport Expressway on-ramp, more mainline capacity will be provided thereby allowing motorists more room to maneuver to their downstream destinations, merge conflicts will be reduced, and backups from I-405 will be improved. These benefits will not be realized if the Proposed Project were not built.

Want to know more about Transportation?

The full *SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Transportation Discipline Report* is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

How were travel forecasts and patterns determined?

Existing and forecast traffic volumes were developed to assess potential project effects on existing and proposed roadway configurations for SR 518 and surrounding roadways. Travel forecasts were based on existing traffic patterns and changes forecasted by the Puget Sound

Typical congestion looking east on SR 518

Regional Council's (PSRC) *Transportation Planning Model*. This planning model forecasts traffic volume based on planned development and growth in the region, in conjunction with general traffic trends. It allows transportation planners to identify traffic levels during particular time periods along specific routes. This project used traffic volumes forecast for the year 2030 for a No-Build Alternative and the Proposed Project.

What time periods were evaluated and why?

Most roadway facilities experience the highest traffic volumes during the morning and evening commute times (peak hours). Depending on the location, the peak hour typically falls between the hours of 7:00 and 9:00 in the morning and 4:00 and 6:00 in the evening. Morning and evening peak hours were both evaluated.

The SR 518 corridor is the main entrance and exit point for Sea-Tac Airport, which typically experiences its peak operations in the middle of the day. To better understand operating conditions on SR 518, the project team met with the cities of SeaTac and Tukwila and the Port of Seattle to discuss SR 518 in terms of congestion, back-ups, travel times and speeds. After these discussions and a review of volume data, the project team concluded that the evening period most likely represented the corridor's overall peak traffic conditions. Therefore, although Sea-Tac Airport may experience its peak during mid-day, the combined peak of both the SR 518 corridor and the airport traffic demand occurs during the evening peak period (4 pm to 6 pm).

What is traffic like now along SR 518 and what will happen in the future?

On a typical weekday during evening peak hour, 4,000 vehicles currently travel eastbound along the SR 518 corridor. Westbound evening peak hour volumes are 4,600. For year 2030, if the Proposed Project were not built (the No-Build Alternative), eastbound evening peak hour

volumes are forecasted to grow to 4,770, with westbound volumes growing to 5,600. With the Proposed Project in 2030, eastbound traffic is estimated to grow to 5,100 during the evening peak hour due to the additional capacity, maneuverability, and improved operations provided by the project. Westbound traffic is not affected by the Proposed Project.

How will traffic operations change along SR 518 with the Proposed Project?

Traffic operations were forecast for both the morning and evening peak hour periods. The following discussion provides an overview of the findings.

AM Peak Hour

Freeway operations for the morning peak hours were analyzed. Speeds and travel times are projected to improve along the corridor if the Proposed Project is built. The Proposed Project will not result in modifications to westbound SR 518 and, as a result, will not directly affect traffic operations on the westbound SR 518 mainline.

The model results show the following:

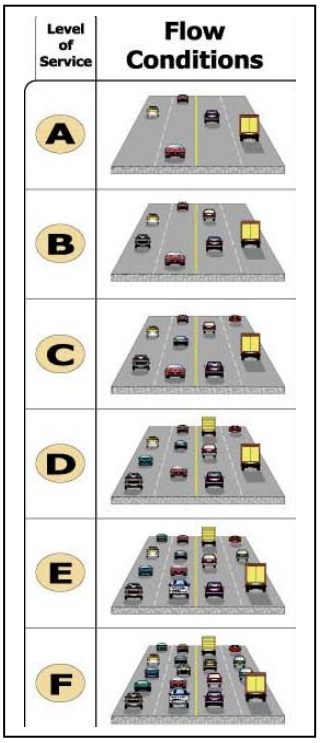
- In 2030, under the No-Build Alternative, travel time on the North Airport Expressway is expected to be about 2 minutes. Travel time on SR 518 between the airport and I-405 is expected to be about 8.5 minutes.
- Currently, morning peak operations on SR 518 are characterized by speeds in the range of 40 to 50 miles per hour (mph), with some congestion between the North Airport Expressway ramp and I-5.
- Forecasted traffic volumes for the No-Build Alternative result in heavy congestion, Level of Service F, and lengthy backups west of the North Airport Expressway/SR 99 interchange on eastbound SR 518. This is due to difficult merging conditions at the North Airport Expressway on-ramp and heavy volumes east of the North Airport Expressway on-ramp. Speeds near the North Airport Expressway on-ramp drop to about 10 mph.

Speeds resume to about 50 mph near the 51st Avenue South off-ramp but are unstable through to I-405.

- In 2030, for the Proposed Project, travel time on the North Airport Expressway is expected to be about two minutes, the same as with the No-Build Alternative for the AM peak. Traffic will experience Level of Service C operations. Travel time on SR 518 between the airport and I-405 will be about three minutes, 5.5 minutes less than the No-Build Alternative.
- For the Proposed Project, the modification of the North Airport Expressway on-ramp from a merge condition to an add-lane (which becomes the third lane on eastbound SR 518) largely eliminates the congestion projected under the No-Build Alternative. The Proposed Project will keep speeds above 40 mph. Level of Service will range from A/B to C.
- Morning peak hour for the Proposed Project is expected to operate at free-flow conditions, above 40 mph, for SR 518 west of the 51st Avenue South off-ramp. The additional eastbound lane included in the Proposed Project will provide new mainline capacity and more room for drivers to maneuver to their desired downstream destinations.
- The Proposed Project will reduce merge conflicts by separating the North Airport Expressway on-ramp from the SR 99 on-ramp. Currently, there is about 600 feet between the on-ramps. The Proposed Project will separate these ramps by about 100 feet. Speeds for all alternatives are unstable east of the 51st Avenue South off-ramp due to ramp-related congestion and weaving.

A comparison of future operations is shown in **Exhibits 4-6** and **4-7**.

Level of Service is a measure that describes vehicle speed and traffic operations conditions



Source: Highway Capacity Manual, 2004

Exhibit 4-6

Eastbound Speeds, Level of Service, and Travel Times 2030 No-Build: AM Peak Period

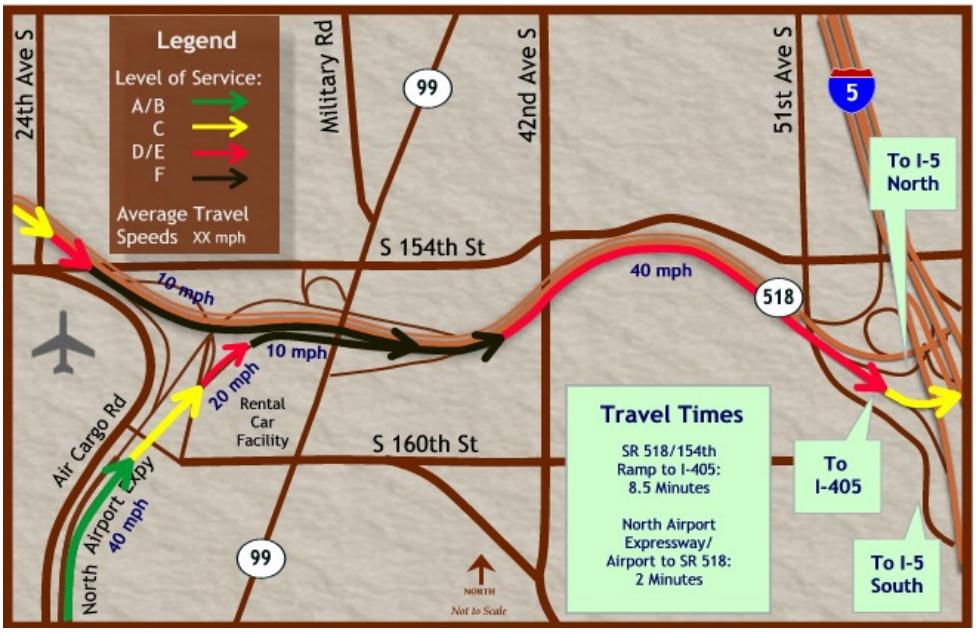
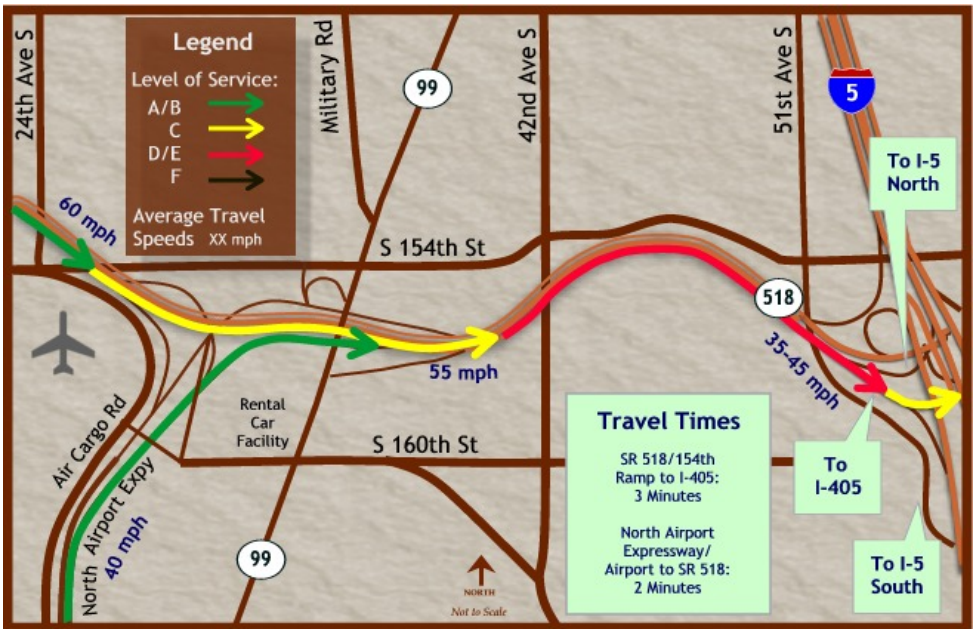


Exhibit 4-7

Eastbound Speeds, Level of Service, and Travel Times 2030 Proposed Project: AM Peak Period



PM Peak Hour

Freeway operations for the evening peak hours were analyzed. Speeds and travel times are projected to improve along the corridor and at key locations under the Proposed Project.

- Today, congestion on SR 518 occurs regularly at two locations during the evening peak on eastbound SR 518: the North Airport Expressway/SR 99 interchange and the I-405/I-5 interchange. The North Airport Expressway ramp regularly experiences congestion and difficult merging conditions as a result of high ramp volumes, the proximity of the SR 99 on-ramp and North Airport Expressway on-ramp, and congestion on the eastbound SR 518 mainline. Congested conditions on I-405 (and I-5 to a lesser extent) affect operations on eastbound SR 518, with congestion and queues extending back to near 51st Avenue South.
- In 2030, under the No-Build Alternative, travel time on the North Airport Expressway is expected to range from about 8 to 32 minutes. Travel time on SR 518 between the airport and I-405 will be about two minutes. The SR 518 mainline is expected to operate between 15 and 40 mph.
- The No-Build Alternative on the North Airport Expressway shows extensive queuing and speeds under 10 mph, operating at Level of Service F. This is due to very high volumes on the North Airport Expressway, the lane reduction on the North Airport Expressway at the rental car facility ramp location, and the bottleneck that occurs where the North Airport Expressway on-ramp merges with an already congested SR 518.
- In 2030, with the Proposed Project, travel time on the North Airport Expressway is expected to be about 4.5 minutes, a substantial reduction from the 32 minutes under the No-Build Alternative. Travel time on SR 518 between the airport and I-405 will be about three minutes.

- The Proposed Project will accommodate the North Airport Expressway near the rental car facility to include two lanes plus a rental car facility on-ramp; modify the merge condition at SR 518 from a merge to an add-lane; and separate the SR 99 on-ramp merge from the North Airport Expressway merge on SR 518. Analysis shows that these changes will noticeably improve operations on the North Airport Expressway and North Airport Expressway on-ramp, resulting in speeds above 35 mph. Congestion will increase at the merge with SR 518 but will dissipate quickly.
- Under the Proposed Project, the eastbound SR 518 mainline will benefit from the additional capacity provided by a new third lane. With the additional capacity, SR 518 is expected to operate primarily with speeds above 30 mph east of the North Airport Expressway on-ramp.

Exhibits 4-8 and **4-9** on the following pages illustrate the general location of these traffic conditions.

Will operations on SR 518 be affected once projects along I-405 are completed?

Currently, congestion from I-405 backs up well onto the east end of SR 518. By 2030, the *I-405 Implementation Plan* improvements are expected to be in place.

Improvements include an additional northbound lane on I-405 and southbound lane on SR 167, resulting in free-flow conditions on I-405. Analysis shows that congestion in the SR 518 corridor related to back-ups from I-405 will be greatly reduced or eliminated.

The 2030 Proposed Project analysis assumes that the HOV designation (the minimum number of people required to be in a vehicle to use the HOV lane) will change from “2 plus” to “3 plus” by 2030. While SR 518 does not have HOV lanes, I-405 does. This change will result in more vehicles

Exhibit 4-8

Eastbound Speeds, Level of Service, and Travel Times 2030 No-Build: PM Peak Period

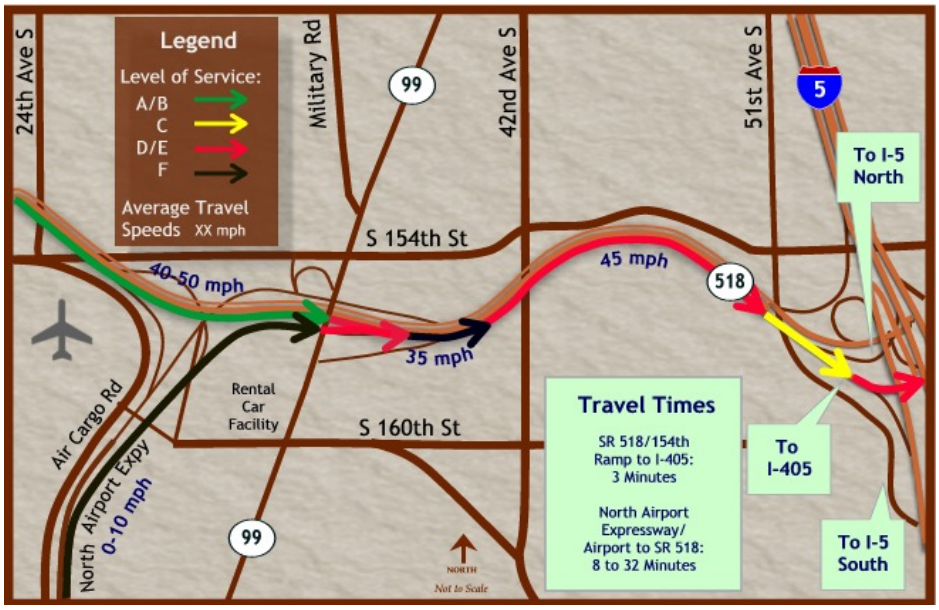


Exhibit 4-9

Eastbound Speeds, Level of Service, and Travel Times 2030 Proposed Project: PM Peak Period

in the general purpose lanes on I-405. These volumes were accounted for in the 2030 Proposed Project and No-Build analyses. An interim year analysis highlighted the importance of completing the *I-405 Implementation Plan* projects to prevent additional congestion on I-405, and consequently SR 518, when the HOV designation change occurs.

How will traffic operations change along local streets?

The Proposed Project will have little or no effect on traffic patterns or traffic volumes on local arterials and SR 99 in particular. The Proposed Project does not include modifications to local arterials but does modify the on-ramp from SR 99 to eastbound SR 518. The on-ramp will be widened and the lanes will be metered during peak periods. The traffic model predicts a queue at the ramp meter that peaks at approximately ten vehicles – within the storage capacity of the on-ramp. As a result, ramp queues should not impact SR 99.

The Proposed Project will not affect pedestrian or bicycle facilities at the interchanges. The Proposed Project will mainly affect ramp and mainline areas that are not accessible to pedestrians or bicyclists.

The following points summarize the findings from the local arterial operations analyses:

- Traffic volume changes between existing conditions and future-year scenarios (the No-Build and Proposed Project) are modest for the AM and PM peak hours.
- Currently, most study intersections operate at an average Level of Service A, with a few at Level of Service B, C, and D. Only one intersection, Military Road and SR 99, operates at Level of Service F in the PM peak. Average levels of service for study area intersections are not expected to change significantly with the future-year scenarios. The analysis of future-year scenarios assumes the optimization of signals, which will mitigate some impacts of increased volumes.

- Intersection operations at the eastbound and westbound off-ramps to South 154th Street and SR 99 are complex and highly variable due to the interplay of ramp traffic and arterial traffic on South 154th Street. The arterial analysis shows a worst-case scenario, with operations at Level of Service C for the eastbound ramp and Level of Service F for the westbound ramp.
- Overall average vehicle delays for existing conditions in the AM peak hour will not change significantly in the future-year scenarios (approximately forty seconds per vehicle). Average vehicle delays for the PM peak hour will be expected to nearly double, but are still considered to be at low congestion levels.

How will construction of the Proposed Project affect traffic conditions?

No long-term closures of SR 518 in either direction are expected during construction. However, temporary lane shifting will be required to provide a safe construction environment.

How will construction disruptions be mitigated?

While under construction, the number of lanes existing today will be maintained during peak hours. This will be achieved by shifting lanes during some construction activities.

Want to know more about Water Resources?

The full SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Water Resources Discipline Report is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

7 Water Resources

Understanding the existing conditions of water resources in the study area, and the environmental factors that already influence them, is essential to anticipating what potential impacts the Proposed Project might have on them. Many environmental factors influence the location, amount, and quality of surface water and ground water resources. These factors include the climate, landscape characteristics (such as topography and soils), geology, and land use patterns.

Stormwater mitigation measures will be implemented to minimize and/or eliminate permanent impacts to surface (Gilliam Creek) and ground water resources. Overall, water quality conditions in the project area would be improved by treating runoff from impervious surfaces and following WSDOT's new Highway Runoff Manual guidelines. If the Proposed Project is built and not mitigated, an increase in the impervious area along with compacted soils will result in increased peak flows in Gilliam Creek, which in turn will potentially increase erosion in the stream corridor and flooding during storms. An increase in impervious surfaces will also potentially reduce ground water recharge, potentially resulting in a decrease in base flow in Gilliam Creek. If the Proposed Project is built and not mitigated, an increase in pollutant loadings in runoff entering Gilliam Creek could also result, further degrading the stream's water quality.

How were water resources evaluated for the project?

Natural water resources typically include surface water (also in the form of stormwater), floodplains, lakes, wetlands, and ground water. Project team members evaluated the study area's water resources by performing field work and reviewing numerous maps and plans, geographic databases, aerial photographs, water quality studies, databases on point sources (such as pipes, ditches, channels, and wells), and other recent data.

View of Gilliam Creek from East of 42nd Avenue South, Looking West

What water resources are found in the project area?

The project area contains the following water resources:

SURFACE WATER

Surface waters are waters stored or flowing at the earth's surface including natural bodies of water (rivers, lakes, and wetlands), as well as water in human-made storage and conveyance facilities (impounded lakes, detention ponds,

ditches, and piped drainage systems). When surface water, sometimes in the form of stormwater, cannot be absorbed by the ground, runoff occurs and volumes increase. Increases in runoff volumes can cause stream bank erosion and increased flooding risks.

The entire project area lies within the Gilliam Creek watershed. Gilliam Creek, a tributary of the Green River, is the only surface water body in the study area, as shown in **Exhibit 4-10**.

WETLANDS

A number of wetlands are located within the study area. Please refer to page 3-33 for a full discussion on existing wetlands and potential impacts resulting from the Proposed Project.

FLOODPLAINS

There are no published floodplain maps for Gilliam Creek upstream (west) of I-5 in the project area. During storms, increased flows in Gilliam Creek, within the project area, stay within the channel banks. As a result, no flooding of streets or property has occurred near SR 518.

Exhibit 4-10
Gilliam Creek within the Project Study Area

GROUNDWATER

Shallow groundwater is present on the hillside south of SR 518 between SR 99 and I-5, as indicated by seepage flows that emerge from the hill slope in many locations.

A review of relevant King County data sources revealed that no wellhead protection areas or critical aquifer recharge areas are located in the project vicinity. In addition, research of available information sources indicates there are no water wells within the project limits (King County 2005, Ecology 2005).

WATER QUALITY

The city of Tukwila has designated Gilliam Creek for:

- Salmon and trout spawning;
- Non-core-rearing and migration; and
- Primary contact recreation.

Gilliam Creek is identified as having impaired water quality conditions (Herrera, 2001). Gilliam Creek is impaired in terms of both contact recreation uses (fecal coliform concentrations exceed the state criterion and are high relative to concentrations found in other streams in the region), and aquatic life uses (three out of six water samples failed to meet state criteria for chronic copper toxicity). While dissolved zinc concentrations did not exceed the state criterion, the high dissolved concentrations found in Gilliam Creek relative to regional stream data indicate that runoff in the Gilliam Creek Watershed contains relatively high zinc concentrations.

How is stormwater runoff conveyed to surface waters in the project area?

Most runoff in the project vicinity is sent to storm drains, ditches, and pipes that discharge directly to Gilliam Creek.

STORMWATER GENERATED ALONG SR 518 BETWEEN SR 99 AND 42ND AVENUE SOUTH

A small portion of runoff from this area is collected in catch basins and sent to the south side of SR 518 to enter the southwest tributary of Gilliam Creek before it passes through a culvert beneath SR 518. Some runoff from the

eastbound shoulder is carried via sheet flow to Gilliam Creek. However, most runoff from this section of SR 518 is collected by catch basins near the median barrier and then piped to a drainage ditch along the north side of the westbound lanes of the highway. This ditch drainage joins with the southwest tributary of Gilliam Creek in a large underground culvert pipe on the north side of SR 518.

STORMWATER GENERATED ALONG SR 518 BETWEEN 42ND AVENUE SOUTH AND 51ST AVENUE SOUTH

Runoff from the eastbound lanes discharges in sheet flow into a ditch running east along the southern shoulder of SR 518. Runoff from the westbound lanes is collected by catch basins in the median of the highway and piped to this same ditch along the southern shoulder. Runoff from the ditch in this area enters two culverts that convey the flow north to Gilliam Creek and beyond the WSDOT right-of-way.

STORMWATER GENERATED ALONG SR 518 BETWEEN 51ST AVENUE SOUTH AND I-5

Runoff from the 51st Avenue South bridge discharges in sheet flow to the north and is collected in catch basins. The flow collected in these catch basins is conveyed in storm drains on the north side of SR 518 toward the east. This drainage, as well as other highway runoff collected by the existing catch basin/storm drain system for this section of SR 518, is piped east along SR 518 until it meets a culvert below I-5, which conveys flows into Gilliam Creek.

How will stormwater conveyance change with the completion of the Proposed Project?

The Proposed Project includes construction of a large stormwater detention facility, currently planned at a location north of the westbound on-ramp from 51st Avenue South to SR 518, to reduce peak runoff flow rates and prolong the durations of runoff generated within the project area before that runoff is discharged to Gilliam Creek.

The Proposed Project includes detention storage capacity for runoff from new impervious surfaces and converted

pervious surfaces. The stormwater detention facilities will be designed to mimic the peak flows and flow durations from portions of the SR 518 roadway that would have occurred with forested land cover, in accordance with city of Tukwila requirements. Overall the Proposed Project will not increase peak flows discharged to Gilliam Creek. Because runoff from these project areas will be controlled to match forested hydrologic conditions, whereas these same project areas are not currently forested, the Proposed Project will reduce peak flows discharged to Gilliam Creek compared to existing conditions. This net result will slightly improve upon high flow conditions in Gilliam Creek in the rainy season.

IMPROVED WATER QUALITY DUE TO PROPOSED STORMWATER TREATMENT SYSTEMS

The proposed stormwater facilities will include treatment systems for runoff from new impervious surfaces. Ecology embankments are proposed for "enhanced" treatment of runoff from portions of SR 518 per WSDOT's *Highway Runoff Manual* requirements. None of the runoff from SR 518 within the project area is treated in the existing condition.

Ecology embankments will be located along the eastbound road shoulder for much of the length of the project corridor, and also on the westbound road shoulder. These facilities will be designed to remove pollutants carried in runoff from portions of the SR 518 roadway within the project area. They will also collect drainage from portions of the existing shoulders and lanes of SR 518. Based on the estimates of average annual pollutant loadings to Gilliam Creek with and without the Proposed Project, it is expected that the quality of runoff discharged from SR 518 to Gilliam Creek will be slightly improved over existing conditions because of the implementation of stormwater treatment facilities.

Are there any stormwater detention facilities in the project vicinity?

A stormwater detention and treatment pond is located well north of the project area, at 42nd Avenue South and South 152nd Street along the north tributary of Gilliam Creek. Recent commercial developments along SR 99 and south of SR 518 likely include stormwater detention vaults.

The city of Tukwila and Sound Transit are planning to construct a regional in-stream detention facility at the confluence of the north tributary and main stem of Gilliam Creek, just north of Southcenter Boulevard and east of 42nd Avenue South. This facility will have 13 acre-feet of detention storage capacity (Lider, 2005, personal communication) and is planned for construction in the near future.

Exhibit 4-11

Altered Impervious and Pervious Surfaces Resulting from the Proposed Project

Type of Impervious Surface	Amount (in acres)
New	2.6
Replaced	1.3
Converted Pervious Surface*	1.5

**Off-road areas on the south side of SR 518 that currently consist of trees and shrubs between 42nd Avenue South and 51st Avenue South that will be cleared and graded for improved sight distance at the toe of the hillslope.*

How would water resources be impacted if these measures were not in place?

If the Proposed Project did not address water resource impacts, the following could result:

IMPACTS DUE TO CHANGES IN IMPERVIOUS SURFACE AREA

Increasing the amount of impervious surface within the project area will slightly increase the quantity of stormwater runoff and decrease infiltration. **Exhibit 4-11** presents a summary of changes to impervious surface area.

The increased impervious surface area subject to highway traffic will likely increase the pollutant loading in highway runoff. However, as described in Chapter Three (beginning on page 3-9), the project will include stormwater treatment facilities to offset this impact.

IMPACTS DUE TO COMPACTED SOILS

Permanent compaction of soils may result from construction activities, potentially contributing to a permanent decrease in soil permeability, water infiltration, and water storage capacity. These changes could also result in increased stormwater runoff. The natural soil characteristics in the project area are not conducive to significant infiltration, and much of the soil adjacent to the

highway is already compacted from previous construction activities. Thus, impacts resulting from further compaction of soils are expected to be minimal.

What has been done to avoid or minimize adverse effects on water resources?

The Proposed Project is designed to avoid or minimize adverse effects that could otherwise occur in Gilliam Creek. Because Gilliam Creek is severely altered and degraded compared to its natural condition, it is important that stormwater treatment and flow control measures be included in project plans for protection of the already stressed stream. The stormwater treatment and detention facilities that will be built as part of the Proposed Project will support the city of Tukwila's efforts to improve conditions in Gilliam Creek.

In addition, the following mitigation measures will be considered in accordance with applicable state and local regulations:

- A Temporary Erosion and Sedimentation Control Plan will be implemented during construction to control stormwater runoff and minimize sediment transport to Gilliam Creek. These measures will greatly reduce the extent of temporary water quality impacts that occur in the creek.
- A Spill Prevention, Control, and Countermeasures (SPCC) Plan will be in effect during project construction according to WSDOT standards. This plan details containment and cleanup procedures in the event of a spill of fuel or other chemicals during project construction. Effective implementation of the SPCC Plan will greatly reduce the potential for release of toxic materials to Gilliam Creek during construction.

How could the Proposed Project temporarily affect water resources?

Potential construction impacts could result from construction activity in one area of the existing Gilliam Creek channel where a retaining wall is proposed on the

south side of the widened on-ramp from SR 99 to eastbound SR 518. Additionally, excavation, grading, filling, and other road construction activities have the potential to temporarily add sediment and other pollutants to Gilliam Creek. The relocation of ditches may temporarily increase ditch bank erosion and runoff turbidity, causing a temporary decrease in Gilliam Creek water quality. These effects will be mitigated during construction using approved BMPs from WSDOT's *Highway Runoff Manual*.

Will any water resource permits be required?

The following water resource permits will be obtained prior to construction:

- Section 404;
- Section 401 Water Quality Certification;
- Hydraulic Project Approval;
- Coastal Zone Management Certification;
- National Pollutant Discharge Elimination System (NPDES) Construction Permit;
- City of Tukwila Special Permission from Director.

8 Wetlands

An understanding of wetlands in the project area is necessary to properly assess potential effects from the project. Wetlands are recognized as important features in the landscape that provide beneficial services for people, fish, and wildlife. An increase in impervious surface from the project design has the potential to adversely affect wetlands.

If the Proposed Project is built, permanent wetland impacts could result from degradation of water quality, changes in hydrologic connections, loss of wetland acreage, and loss of groundwater recharge area.

Compensatory mitigation in the form of wetland creation, restoration, or enhancement will be provided for permanent impacts to wetlands at a mitigation site, most likely within the same Water Resource Inventory Area (WRIA).

Want to know more about Wetlands?

The full SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Ecosystems Discipline Report is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

How were wetlands identified in the project area?

Project team biologists conducted literature reviews and field investigations using methods defined by the *Washington State Wetlands Identification and Delineation Manual* (1997) to determine wetland boundaries and characteristics. This method is in agreement with the U.S. Army Corps of Engineers' method (1987).

Are wetlands located in the project area?

Eight wetlands are located within the project area, five of which will be permanently or temporarily affected by the Proposed Project. **Exhibit 4-12,** on the following three pages, shows the general location of these wetlands. The following discussion summarizes the characteristics of each wetland.

Exhibit 4-12

Wetlands and Streams in the Project Area (Sheet 1)

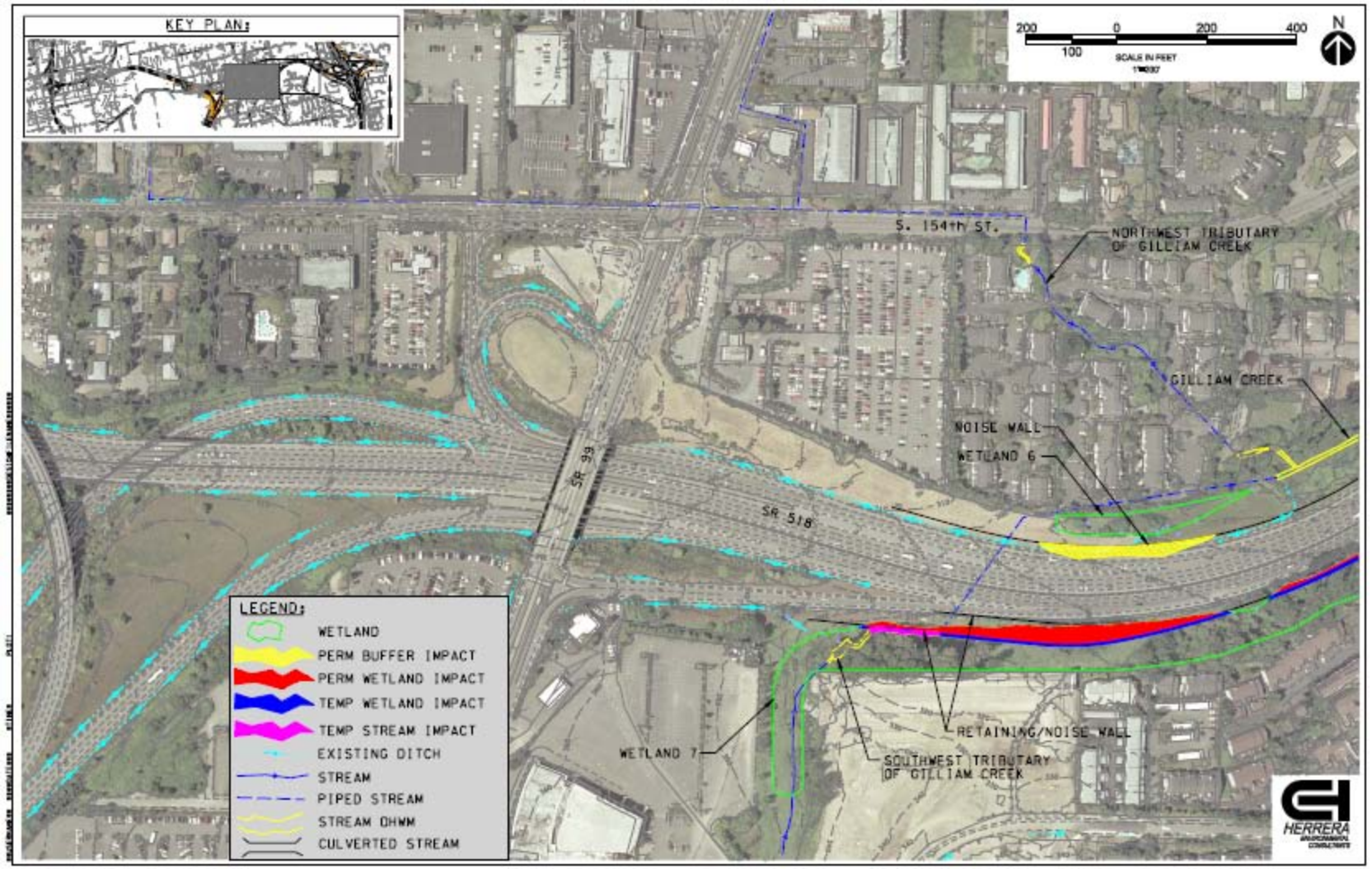


Exhibit 4-12

Wetlands and Streams in the Project Area (Sheet 2)

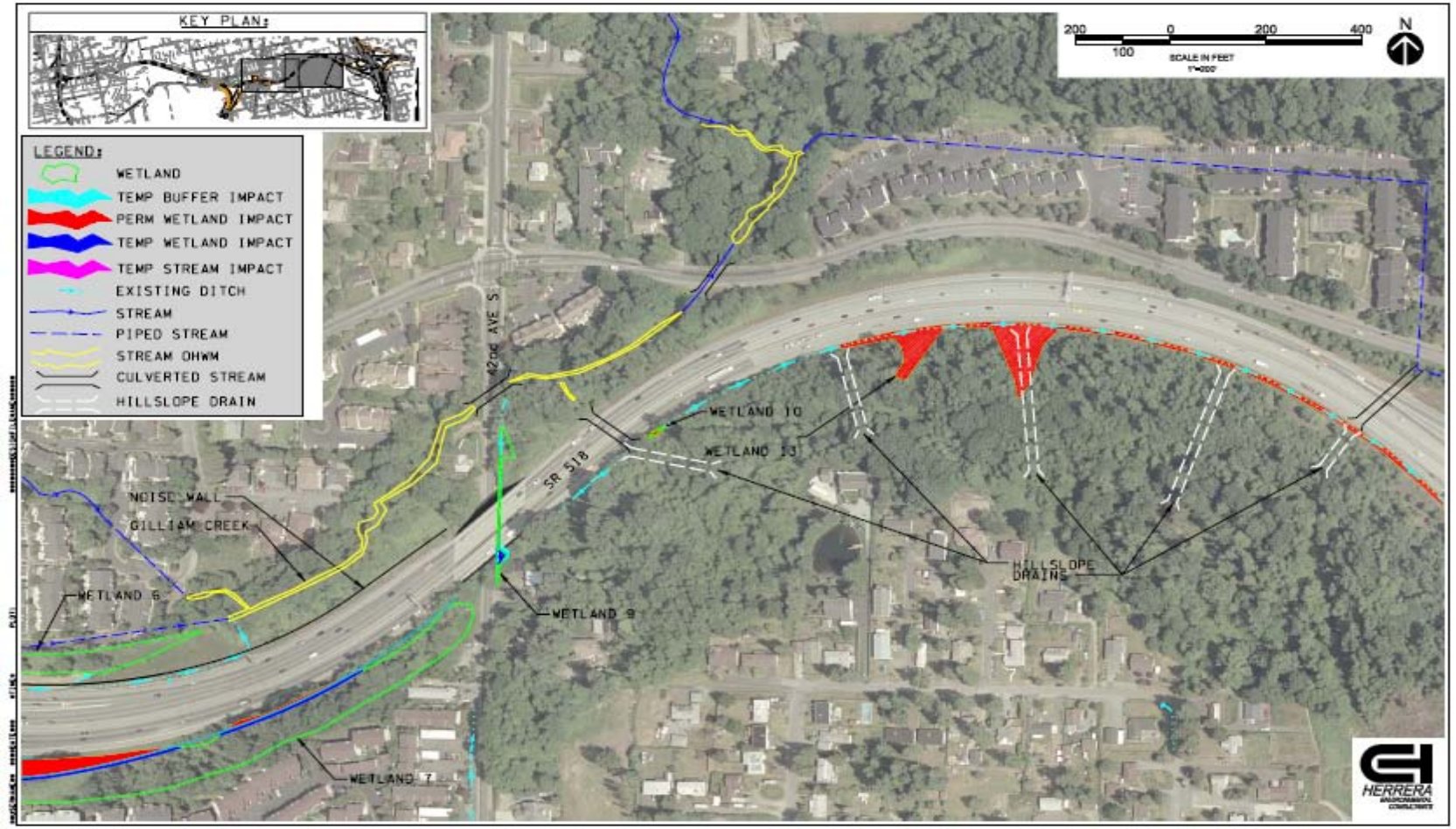
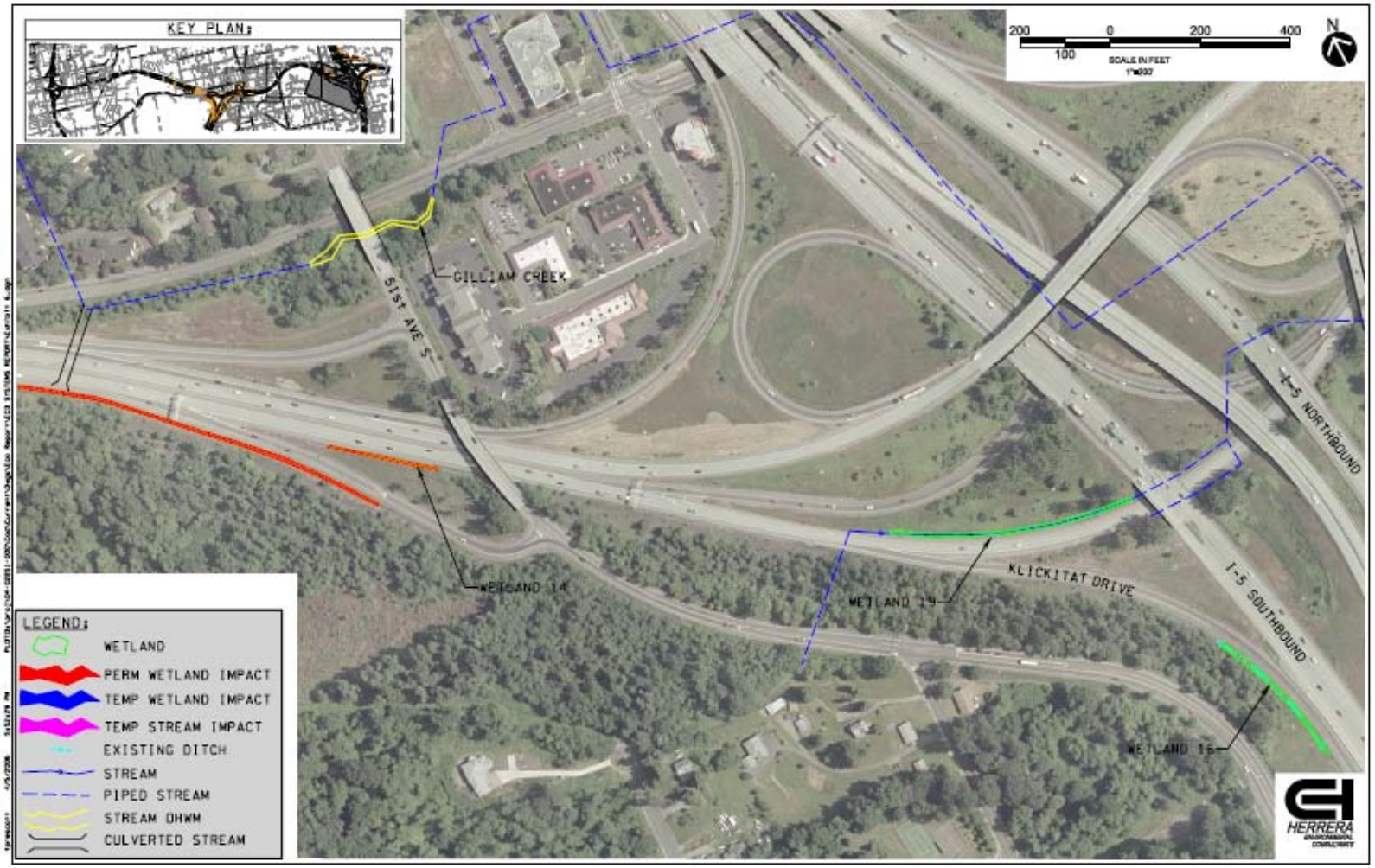


Exhibit 4-12

Wetlands and Streams in the Project Area (Sheet 3)



WETLAND 6 (SEE EXHIBIT 4-12, SHEETS 1 AND 2)
Wetland 6 is a palustrine emergent and scrub-shrub wetland located along westbound SR 518, east of the off-ramp to SR 99. The wetland has the following characteristics:

- Size is approximately 0.48 acre;
- Dominant hydrophytic vegetation includes cattail and soft rush;
- Hydric soil indicators include low chroma and gleyed soils; and
- Water sources for the wetland are groundwater and stormwater flow from SR 518.

What is hydric soil?

Hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (no oxygen) conditions at or near the soil surface. Hydric soils contribute to the formation of some wetland types.

WETLAND 7 (SEE EXHIBIT 4-12, SHEETS 1 AND 2)
Wetland 7 is a palustrine forested and scrub-shrub wetland adjacent to the SR 99 on-ramp to eastbound SR 518. The wetland has the following characteristics:

- Size is approximately 3.86 acres;
- Dominant hydrophytic vegetation includes black cottonwood, red-osier dogwood, and giant horsetail;
- Hydric soil indicators include low chroma soils; and
- Water sources are groundwater and stormwater flow from SR 518.

WETLAND 9 (SEE EXHIBIT 4-12, SHEET 2)
Wetland 9 is a forested and scrub-shrub wetland located along the east side of 42nd Avenue South, beneath the bridge at SR 518. The wetland has the following characteristics:

- Size is approximately 0.072 acre;
- Dominant hydrophytic vegetation includes small-fruited bulrush, giant horsetail, and creeping buttercup;
- Hydric soil indicators include low chroma and gleyed soils with mottles; and

- Water sources are groundwater and stormwater flow from 42nd Avenue South.

WETLAND 10 (SEE EXHIBIT 4-12, SHEET 2)
Wetland 10 is an emergent wetland located in a ditch adjacent to eastbound SR 518, east of the SR 518 bridge over 42nd Avenue South. The wetland has the following characteristics:

- Size is approximately 0.0057 acre;
- Dominant hydrophytic vegetation includes reed canarygrass and giant horsetail;
- Hydric soil indicators include low chroma soil with mottles; and
- Water sources are groundwater and stormwater flow from SR 518.

WETLAND 13 (SEE EXHIBIT 4-12, SHEETS 2 AND 3)
Wetland 13 is an emergent and forested wetland located in a ditch adjacent to eastbound SR 518. The wetland has the following characteristics:

- Size is approximately 0.68 acre;
- Dominant hydrophytic vegetation includes cattail and watercress;
- Hydric soil indicators include gleyed soil and a strong sulfidic odor; and
- Water sources are groundwater and stormwater flow from SR 518.

WETLAND 14 (SEE EXHIBIT 4-12, SHEET 3)
Wetland 14 is an emergent wetland located adjacent to eastbound SR 518. The wetland has the following characteristics:

- Size is approximately 0.029 acre;
- Dominant hydrophytic vegetation includes watercress, soft rush, and reed canarygrass;

- Hydric soil indicators include gleyed soil and a strong sulfidic odor; and
- Water sources are groundwater and stormwater flow from SR 518.

WETLAND 16 (SEE EXHIBIT 4-12, SHEET 3)
Wetland 16 is an emergent and scrub-shrub wetland located along the SR 518 on-ramp to southbound I-5. The wetland has the following characteristics:

- Size is approximately 0.065 acre;
- Dominant hydrophytic vegetation includes soft rush, velvet grass, and reed canarygrass;
- Hydric soil indicators include gleyed soil and mottles; and
- Water sources are groundwater and stormwater flow from the on-ramp.

WETLAND 19 (SEE EXHIBIT 4-12, SHEET 3)
Wetland 19 is an emergent wetland adjacent to the eastern end of SR 518. The wetland has the following characteristics:

- Size is approximately 0.10 acre;
- Dominant hydrophytic vegetation consists of watercress;
- Hydric soil indicators include gleyed soil and a strong sulfidic odor; and
- Water sources are groundwater and stormwater flow from SR 518.

How will the Proposed Project temporarily affect wetlands?

Temporary impacts may occur in wetlands as a result of typical construction activities such as accidental spills of fuel, oils, or chemicals; grading and filling activities; temporary placement of fill in wetlands; and disturbance to vegetation.

How will the project permanently affect wetlands?

Permanent wetland impacts may result from degradation of water quality, changes in hydrologic connections, loss of wetland acreage, and loss of groundwater recharge area. These potential permanent impacts are summarized as follows:

- Eliminating vegetation in wetland areas will result in small losses of wildlife breeding and foraging habitat in the project area.
- Wetland filling will occur during roadway widening and construction of stormwater conveyance facilities.
- Soils compaction may occur during construction activities, potentially contributing to a permanent decrease in soil permeability, water infiltration, and water storage capacity. These changes could increase stormwater runoff and subsequently increase peak stream flow.

What wetland categories will be permanently impacted?

The total area of permanent wetland impacts resulting from the project will be 1.2 acres (this total includes a 0.05-acre contingency). The bulk of the impacts will affect Wetland 13 and Wetland 7, which are both Category III wetlands. Wetlands 9, 10 and 14 will also be impacted.

General Descriptions of Wetland Categories	
I	Unique or rare; more sensitive to disturbances; relatively undisturbed.
II	Difficult to replace; somewhat more common than Category I wetlands.
III	Moderate levels of functions; generally have been disturbed; less diverse than Category II wetlands.
IV	Lowest levels of functions; heavily disturbed.

What has been done to minimize adverse wetland impacts?

A retaining wall will be constructed to reduce permanent impacts on Wetland 7. Wetlands will be affected only in areas where the wetland abuts the existing roadway and highway safety considerations make avoiding the wetland impossible.

What will be done to restore adversely impacted wetland areas?

Wetland and wetland buffer areas that are temporarily affected during construction will be replanted with native species following construction.

How will the project compensate for unavoidable adverse wetland impacts?

Compensatory mitigation for wetland impacts will be provided within WRIA 9, which is the Water Resource Inventory Area in which the wetland impacts will occur. Impacts will be mitigated by purchasing credits from a mitigation bank or by constructing an off-site wetland mitigation site.

Two potential off-site wetland mitigation sites have been selected within WRIA 9. Mitigation activities will include wetland creation, restoration, enhancement, or a combination thereof in support of a Category II wetland, as rated according to the Washington State Department of Ecology criteria. The following replacement ratios will be implemented in accordance with the city of Tukwila municipal code and the implementing agreement between WSDOT and the Washington State Department of Ecology concerning wetlands protection and management (WSDOT, 2004a).

- Creating or restoring wetlands at a 1.5-to-1 replacement ratio;
- Enhancing wetlands at a 3-to-1 replacement ratio; and
- Combining creation or restoration with enhancement based upon the above ratios.

The selected off-site wetland mitigation site will include a 100-foot enhanced wetland buffer.

9 Wildlife and Vegetation

Want to know more about Wildlife and Vegetation?

The full SR 518 North Airport Expressway/SR 99 Interchange to I-5/I-405 Interchange Ecosystems Discipline Report is located on the CD contained in this document. You can also download the document from WSDOT's website: www.wsdot.wa.gov/Projects/SR518

An understanding of wildlife and vegetation in the project area is necessary to properly assess potential effects from the project. Wildlife habitat offers feeding, roosting, breeding, nesting, and refuge areas for a variety of bird, mammal, and other animal species. Construction of the project will potentially impact these resources.

The study area does not contain any federally listed or protected species. However, the U.S. Fish and Wildlife Service (USFWS) identified one federal candidate species and six species of concern as possibly occurring in the project area. None of these species has been observed or documented in the project area and were not observed during field surveys. A Letter of No Effect has been prepared for the project to comply with the Endangered Species Act. The letter shows that the Proposed Project will not adversely affect endangered species. Consultation with the USFWS and National Marine Fisheries Service (NOAA Fisheries) indicated that a Letter of No Effect is appropriate for this project.

If the Proposed Project is built, it will permanently displace wildlife in areas proposed for clearing. Vegetation removal will affect wildlife by reducing food resources and shelter sites. Vegetation removal near aquatic resources will make those resources more exposed to weather and potential pollution. Shading from expanded bridges or increased retention wall heights will reduce plant vigor.

Compensatory mitigation for wetland impacts will most likely be provided within Water Resource Inventory Area 9. Wetland mitigation will involve creating, restoring, or enhancing wetlands.

What methods were used to identify and characterize wildlife and vegetation habitat?

The project team reviewed information provided by the Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Natural Resources

(WDNR), and conducted field surveys within the project area. WSDOT also contacted resource agencies to validate information and to target field studies.

WSDOT has prepared a Letter of No Effect for the project to comply with the Endangered Species Act. The letter shows that the Proposed Project will not adversely affect species that are currently protected under the Endangered Species Act.

What is the Endangered Species Act?

A 1973 federal law, the Endangered Species Act (ESA), amended in 1978 and 1982, was enacted to protect plant and animal species from extinction. The National Marine Fisheries Service and the U.S. Fish and Wildlife Service decide whether to list species as threatened or endangered. Federal agencies must avoid jeopardy to and aid in the recovery of listed species. Similar responsibilities apply to non-federal entities.

What wildlife species and habitats occur in the project area?

No protected species occur in the project area. Wide-ranging species such as red-tailed hawks (*Buteo jamaicensis*), olive-sided flycatchers (*Contopus borealis*), and bats (*Myotis* spp.) may occasionally forage in the open habitats that occur in the general project area.

Do any federally listed wildlife species occur in the project area?

No federally listed species occur in the project area. A bald eagle (*Haliaeetus leucocephalus*) nesting territory is located at Angle Lake, 0.7 mile from the project area. This distance and the McMicken Heights hills, which lie between the proposed project area and the bald eagle territory, will buffer any construction noise effects on bald eagles.

Do any federal species of concern occur in the project area?

The USFWS identified one federal candidate species and six species of concern as possibly occurring in the project area. However, none of these species has been observed or documented in the project area and were not observed during field surveys.

Federal Species of Concern in the Project Area

Oregon spotted frog (*Rana pretiosa*) (candidate species)

White-topped aster (*Aster curtus*)

Olive-sided flycatcher (*Contopus borealis*)

Western pond turtle (*Clemmys marmorata*)

Long-legged myotis (*Myotis volans*)

Long-eared myotis (*Myostis evotis*)

Townsend's big-eared bat (*Corynorhinus townsendii*)

Do any state-listed or other state priority wildlife species occur in the project area?

Red-tailed hawks were observed hunting in open grassy areas in the project area. Great blue herons (*Ardea herodias*) were observed perching in large cottonwoods in riparian forest. Pileated woodpeckers may occur in

forested portions of the project area, although neither woodpeckers nor signs of their presence were observed in the project area.

How will wildlife and vegetation be affected by the project?

The project will result in the removal of existing vegetation and alteration of wetland and stream habitats. These effects will be offset by compensatory mitigation to create, restore and enhance wetlands. In addition to wetlands, the proposed project will remove 2.51 acres of upland forest and 3.13 acres of grass/brush.

The project will permanently displace wildlife in areas proposed for clearing. In addition, vegetation removal will affect wildlife by reducing food resources and shelter sites. Vegetation removal near aquatic resources will make those resources more exposed to weather and potential pollution. Shading from expanded bridges or increased retention wall heights will reduce plant vigor.

How will changes in water quality affect wildlife?

Water quality changes, such as the discharge of sediment or potential pollutants into streams or wetlands, affects wildlife. Sediment released as a result of construction activities can smother aquatic eggs, bury vegetation, and alter stream-flow characteristics. Pollutants can affect wildlife over the short and long term: acute effects include poisoning; permanent effects include reduced vigor and reproductive success.

Will the project result in barriers or obstructions to animal movement?

The project will not result in further obstruction. The project area includes the existing SR 518, which is a major barrier to animal movement, primarily because of the number of vehicles on the highway. Travel speeds and the width of the highway (three lanes in each direction, plus shoulders and medians) act as a barrier to animal movement.

How will project construction temporarily affect wildlife and habitat?

Project construction will temporarily affect wildlife and habitat as a result of temporary vegetation clearing and water quality effects. Temporary vegetation clearing and shading would reduce wildlife habitat until the vegetation is reestablished following construction. Temporary water quality effects would include increased sedimentation and pollutant loadings to receiving water bodies.

How could the project compensate for unavoidable adverse effects on wildlife and habitat?

Areas that are temporarily disturbed during construction will be replanted with grass and native species. Compensatory mitigation for wetland impacts will be provided within Water Resource Inventory Area 9. Wetland mitigation will involve creating, restoring, or enhancing wetlands. A minimum 100-foot-wide upland buffer will also be provided adjacent to wetlands on the mitigation site. The buffer will be enhanced to forested conditions if existing buffers on the site require enhancement. A mature forested buffer on the wetland mitigation site will help mitigate for permanent clearing of upland forest within the project area.

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